Fig.1

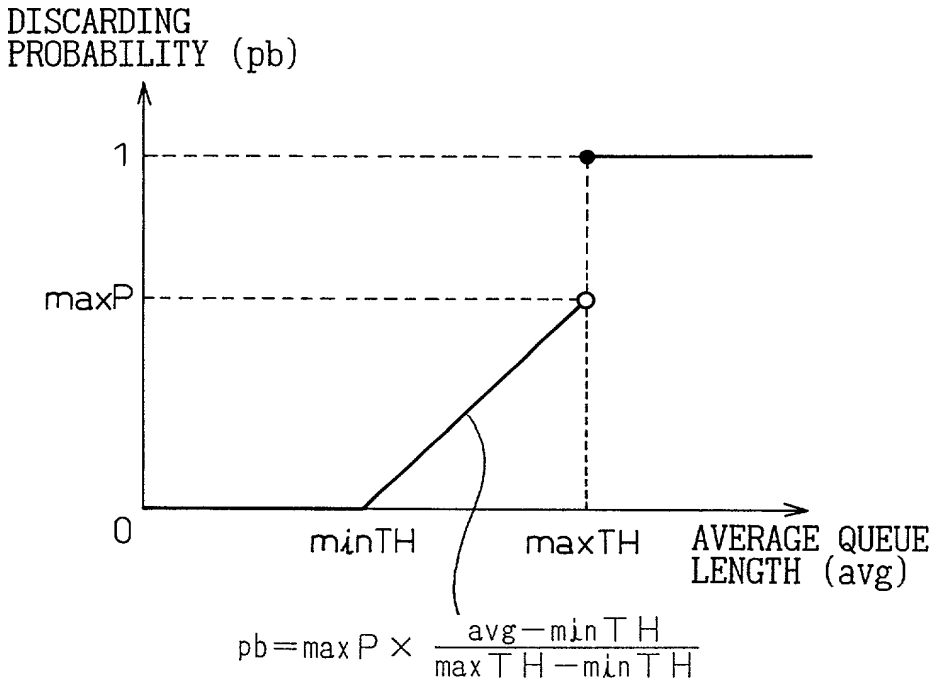


Fig.2

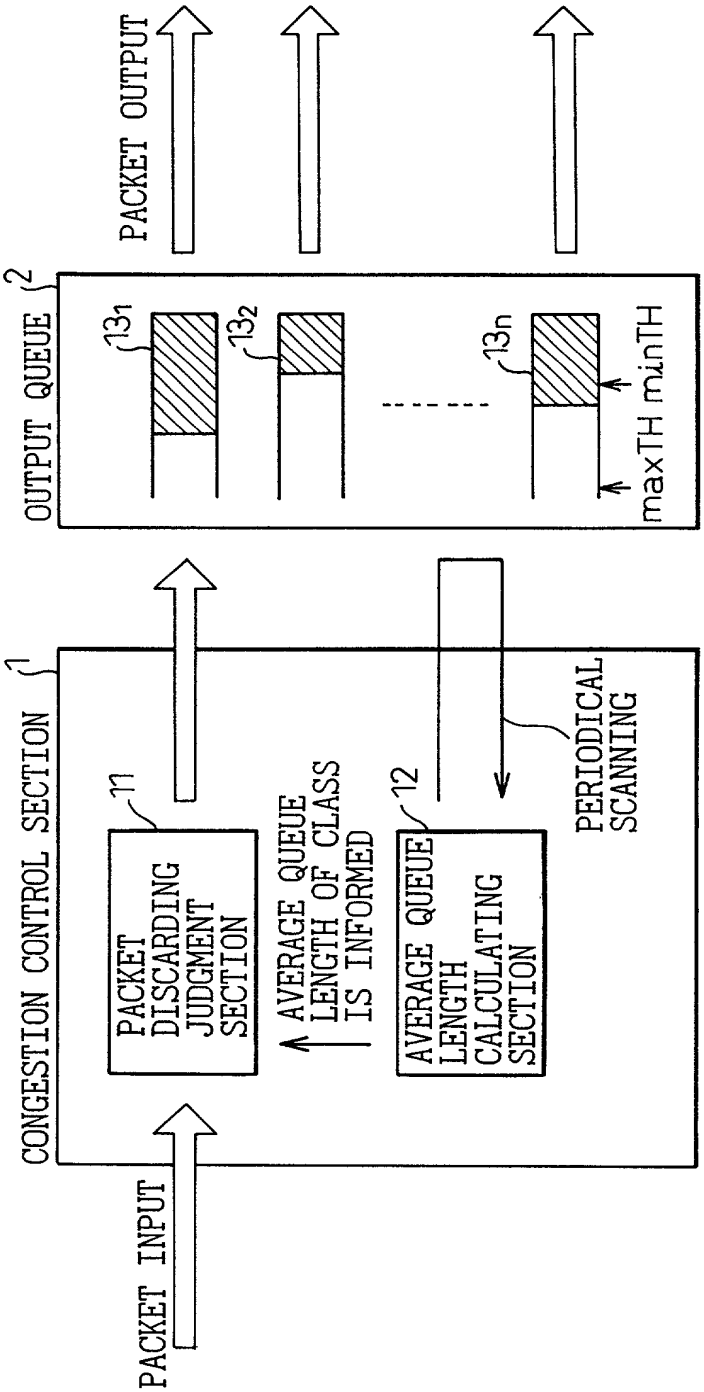

PACKET OUTPUT
OUTPUT QUEUE
2
13_1
13_2
13_n
maxTH
minTH
CONGESTION CONTROL SECTION
1
PACKET DISCARDING JUDGMENT SECTION
11
AVERAGE QUEUE LENGTH OF CLASS IS INFORMED
AVERAGE QUEUE LENGTH CALCULATING SECTION
12
PERIODICAL SCANNING
PACKET INPUT

Fig.3

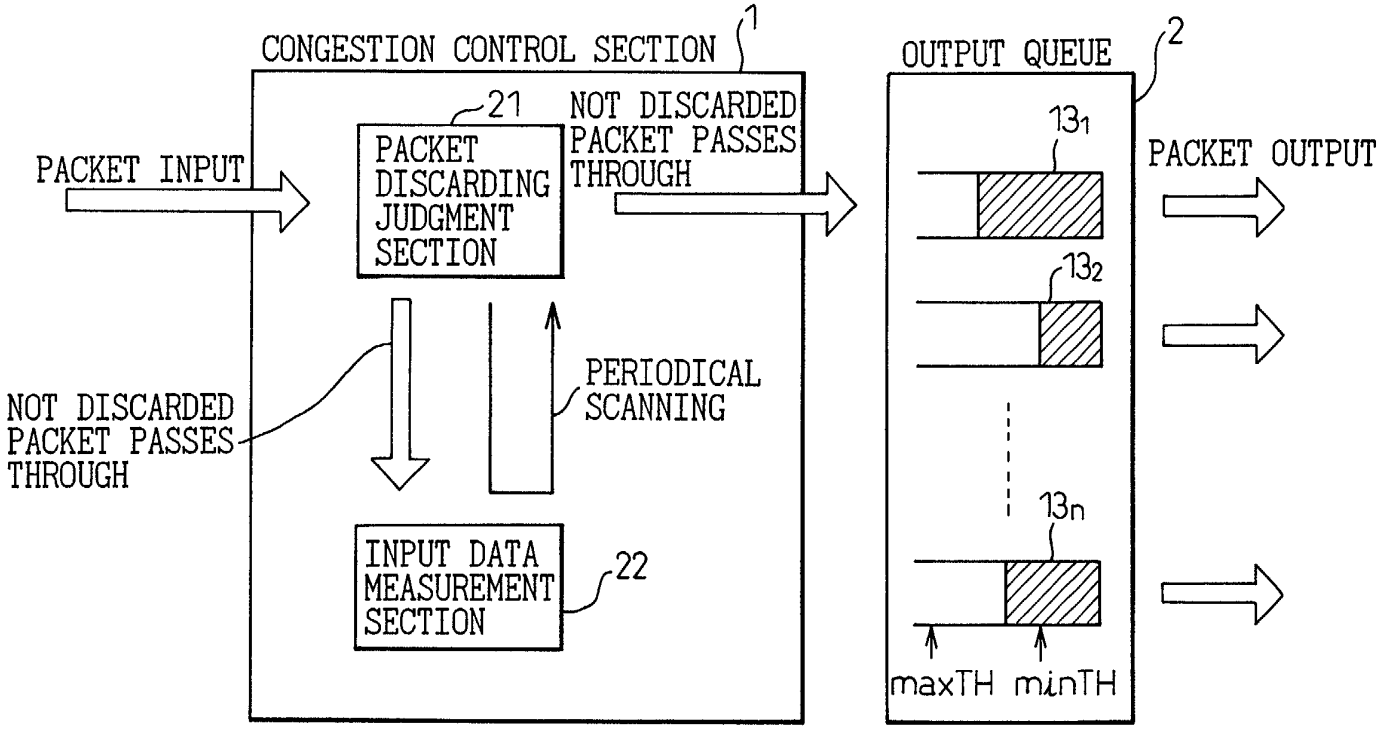
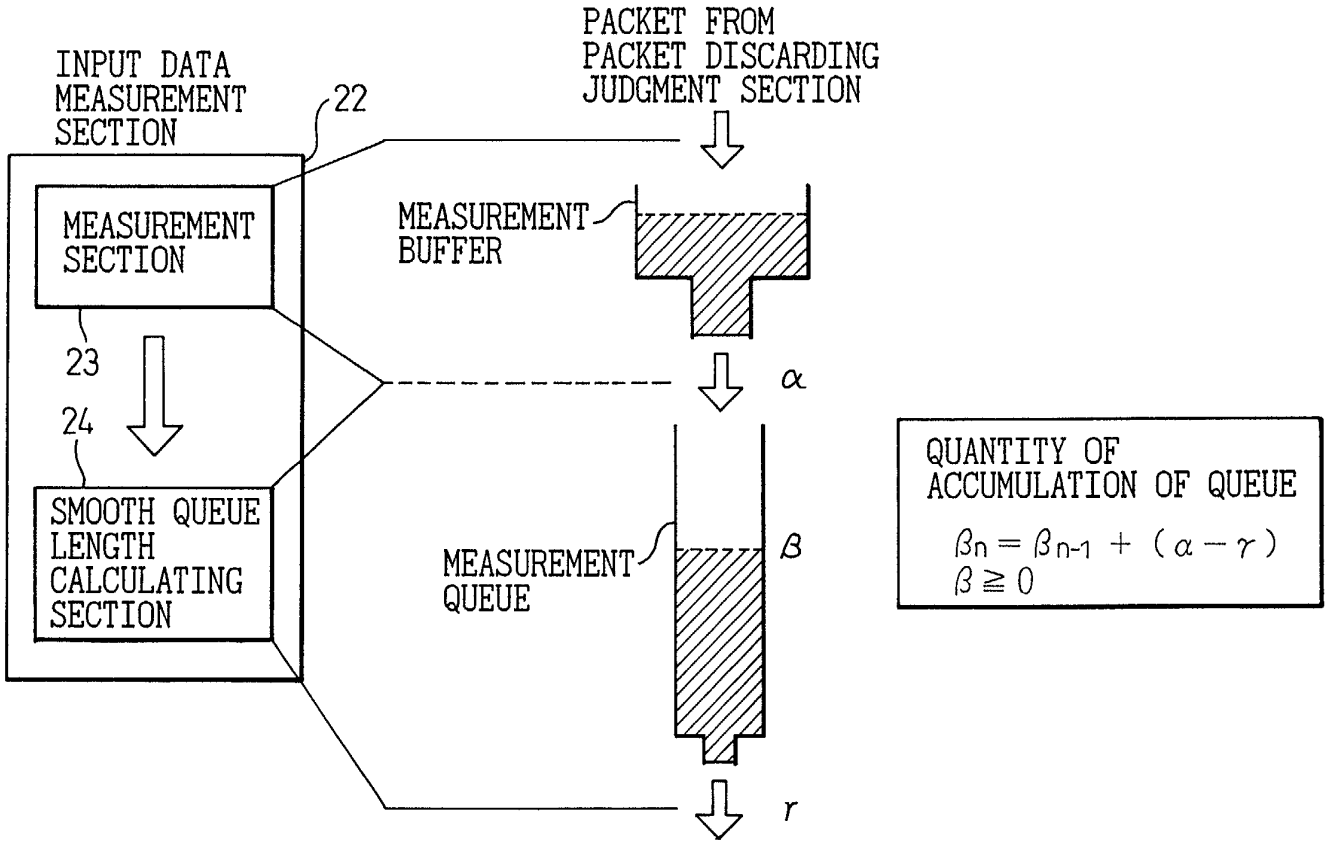

CONGESTION CONTROL SECTION
1
OUTPUT QUEUE
2
21
PACKET INPUT
PACKET DISCARDING JUDGMENT SECTION
NOT DISCARDED PACKET PASSES THROUGH
PACKET OUTPUT
13_1
13_2
13_n
NOT DISCARDED PACKET PASSES THROUGH
PERIODICAL SCANNING
INPUT DATA MEASUREMENT SECTION
22
maxTH
minTH

Fig.4



α : QUANTITY OF DATA OUTPUTTED FROM MEASUREMENT BUFFER AT EACH Δt
β : SMOOTH QUEUE LENGTH (QUANTITY OF ACCUMULATION OF DATA OF MEASUREMENT QUEUE)
γ : QUANTITY OF DATA OUTPUTTED FROM MEASUREMENT QUEUE (=OUTPUT QUEUE) IN Δt

Fig.5A

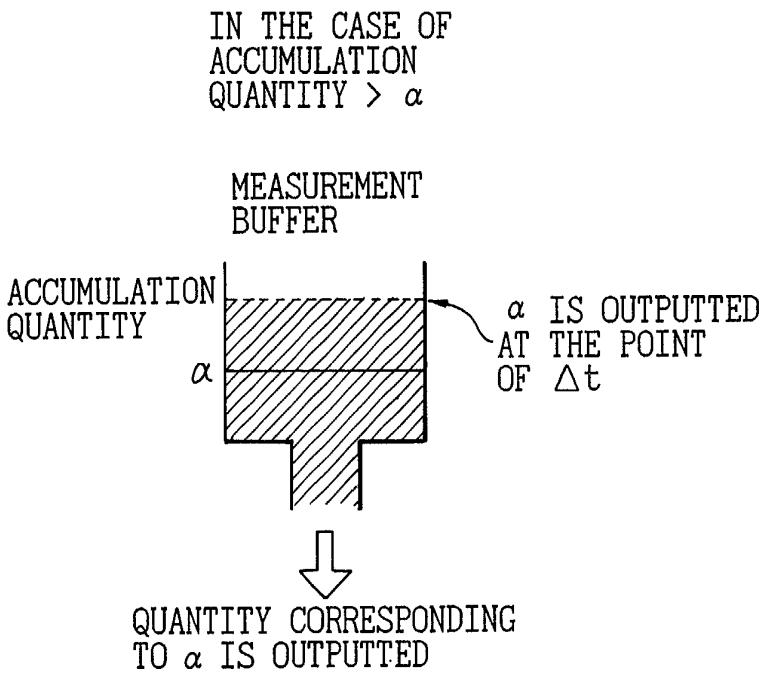


Fig.5B

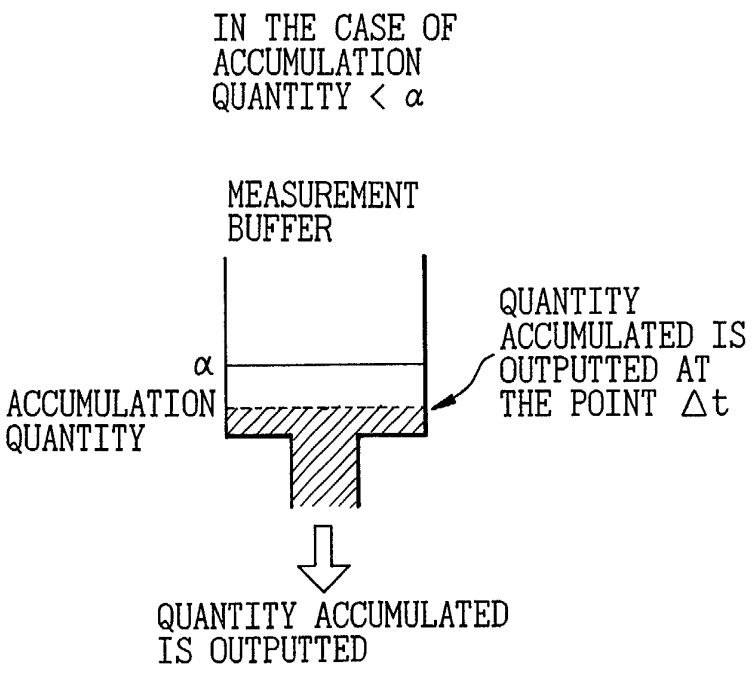


Fig.6

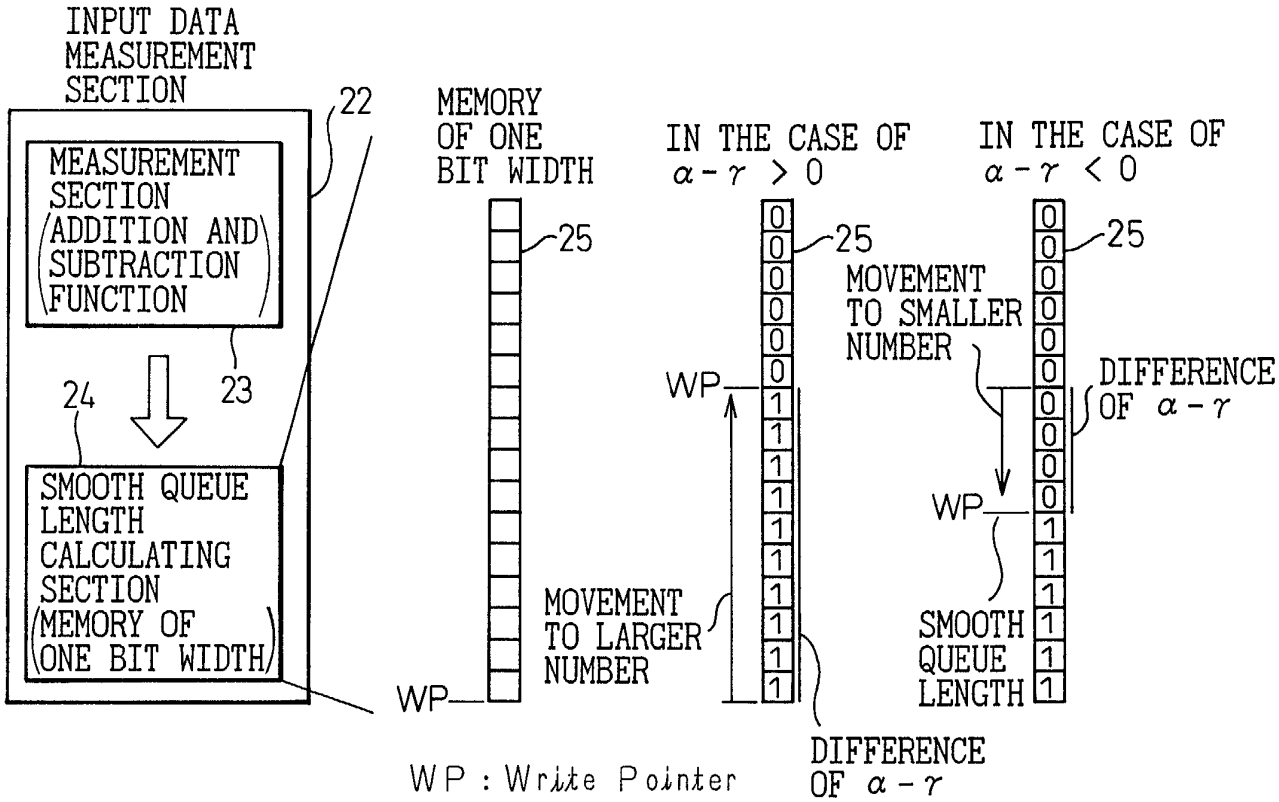
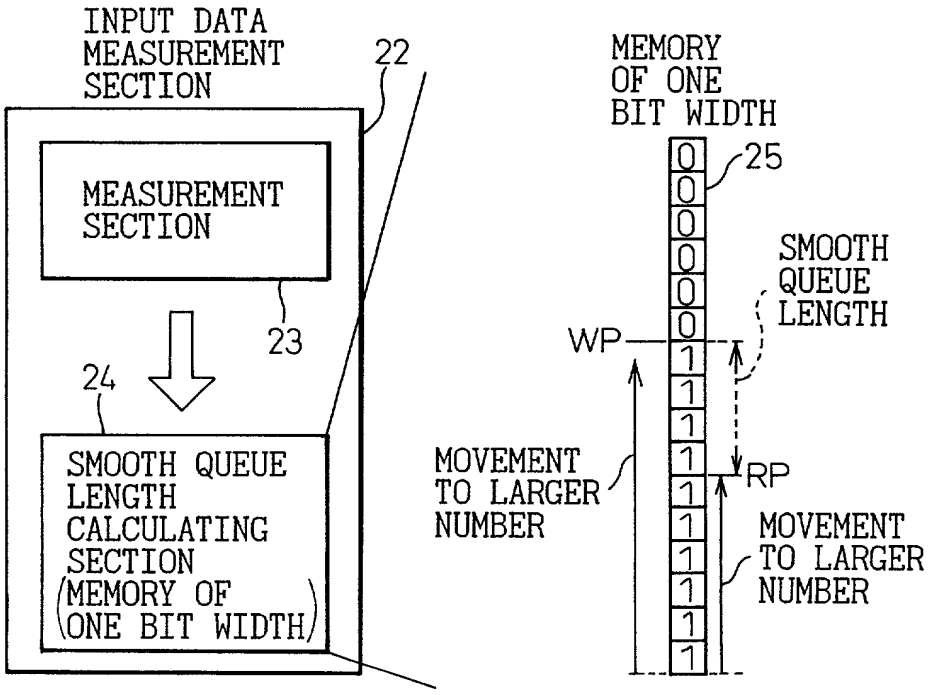
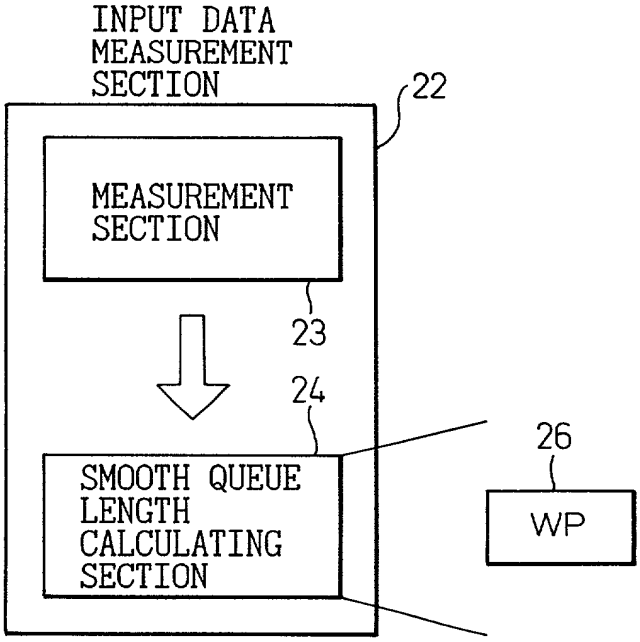

INPUT DATA MEASUREMENT SECTION
22
MEASUREMENT SECTION (ADDITION AND SUBTRACTION FUNCTION)
23
24
SMOOTH QUEUE LENGTH CALCULATING SECTION (MEMORY OF ONE BIT WIDTH)
MEMORY OF ONE BIT WIDTH
25
WP
MOVEMENT TO LARGER NUMBER
DIFFERENCE OF α - γ
IN THE CASE OF α - γ > 0
IN THE CASE OF α - γ < 0
MOVEMENT TO SMALLER NUMBER
SMOOTH QUEUE LENGTH
WP : Write Pointer

Fig.7



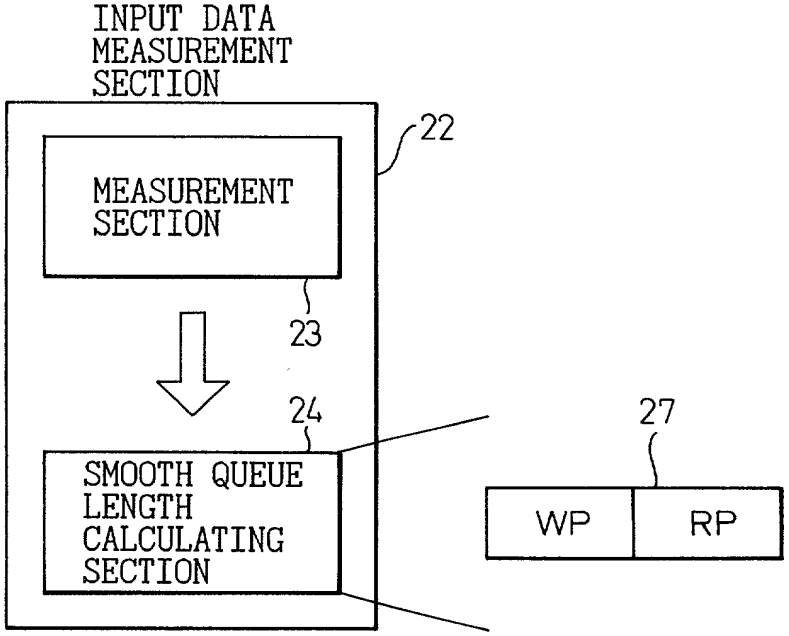
WP : Write Pointer RP : Read Pointer

Fig.8



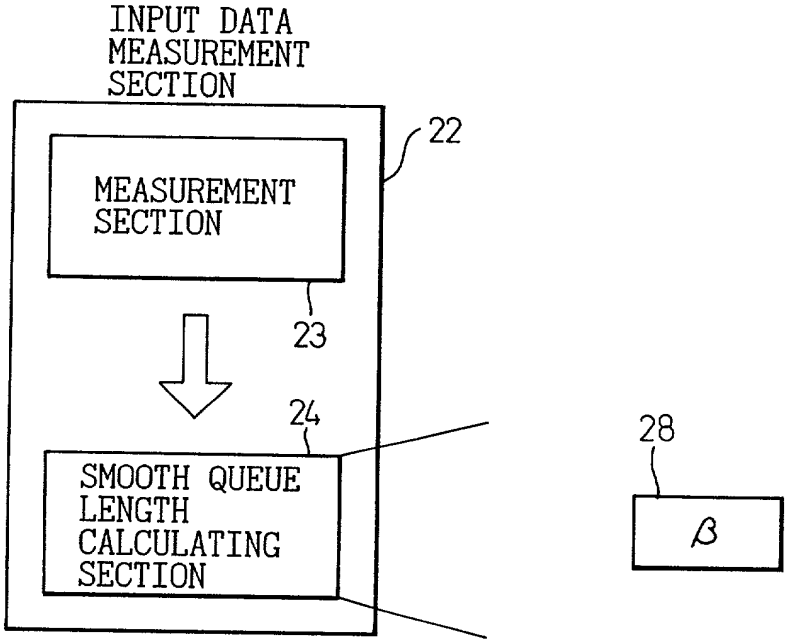
WP : Write Pointer

Fig.9



WP : Write Pointer RP : Read Pointer

Fig.10



β: SMOOTH QUEUE LENGTH

Fig.11A

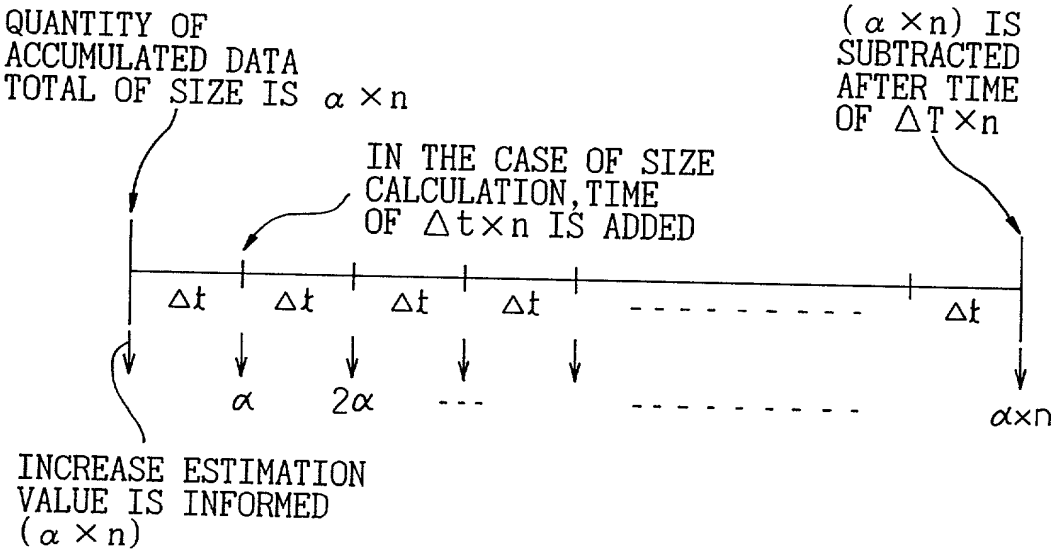
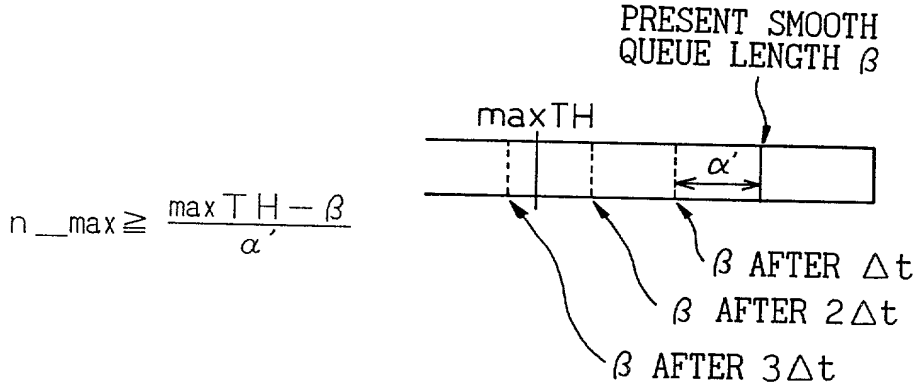


Fig.11B



$$n\_max \geqq \frac{maxTH-\beta}{\alpha'}$$

$$\alpha' = \alpha - \gamma$$

Fig.12

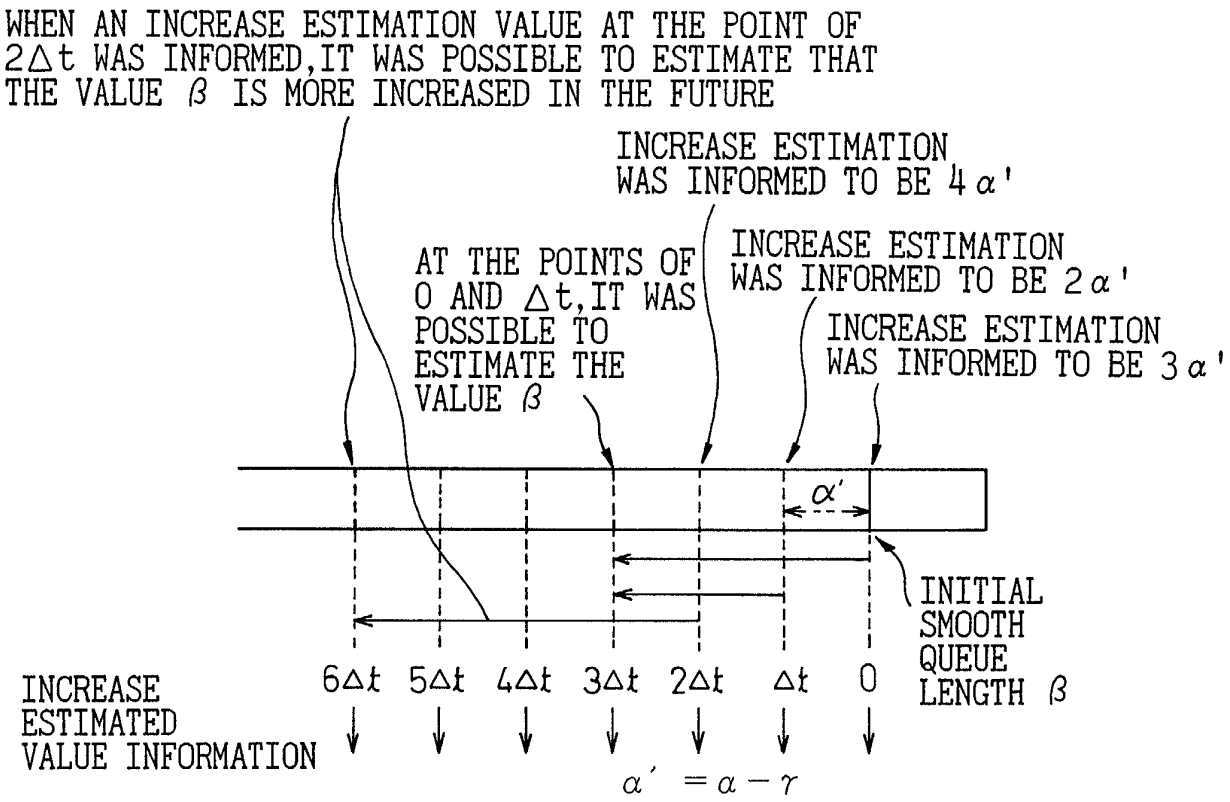

WHEN AN INCREASE ESTIMATION VALUE AT THE POINT OF 2△t WAS INFORMED,IT WAS POSSIBLE TO ESTIMATE THAT THE VALUE β IS MORE INCREASED IN THE FUTURE
INCREASE ESTIMATION WAS INFORMED TO BE 4α'
AT THE POINTS OF 0 AND △t,IT WAS POSSIBLE TO ESTIMATE THE VALUE β
INCREASE ESTIMATION WAS INFORMED TO BE 2α'
INCREASE ESTIMATION WAS INFORMED TO BE 3α'
α'
INITIAL SMOOTH QUEUE LENGTH β
INCREASE ESTIMATED VALUE INFORMATION
6△t 5△t 4△t 3△t 2△t △t 0
α' =α−γ

Fig.13

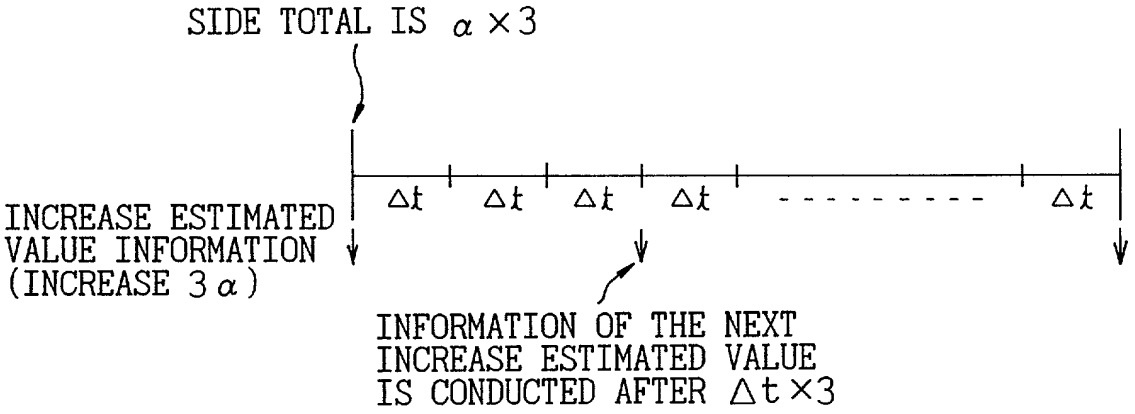

SIDE TOTAL IS α×3
INCREASE ESTIMATED VALUE INFORMATION (INCREASE 3α)
Δt
Δt
Δt
Δt
Δt
INFORMATION OF THE NEXT INCREASE ESTIMATED VALUE IS CONDUCTED AFTER Δt×3

Fig.14

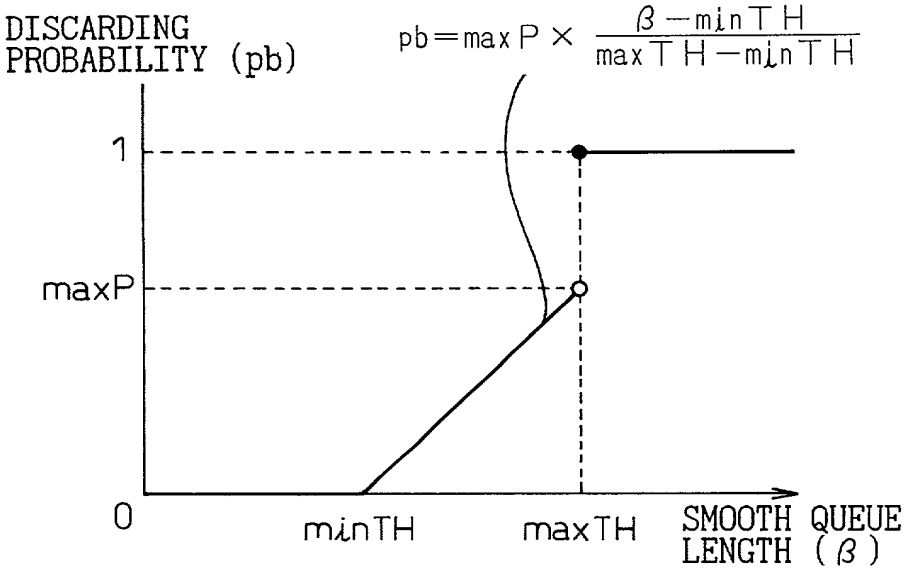

DISCARDING PROBABILITY (pb)
pb=maxP×(β−minTH)/(maxTH−minTH)
1
maxP
0
minTH
maxTH
SMOOTH QUEUE LENGTH (β)

Fig.15

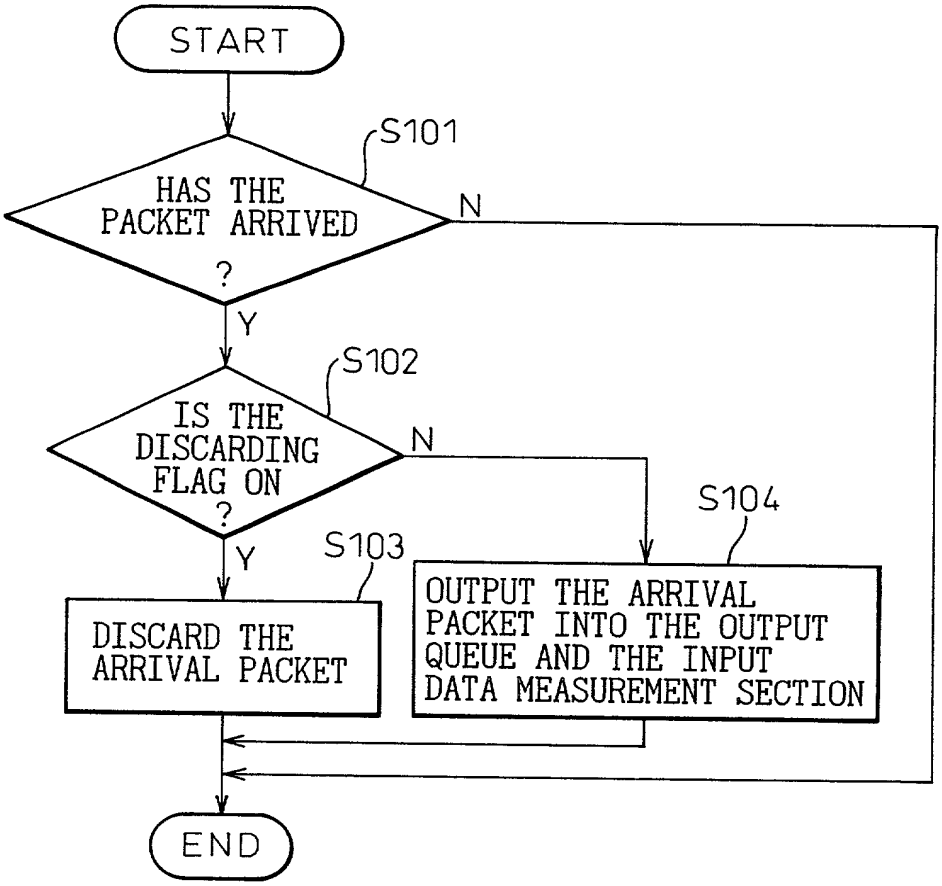
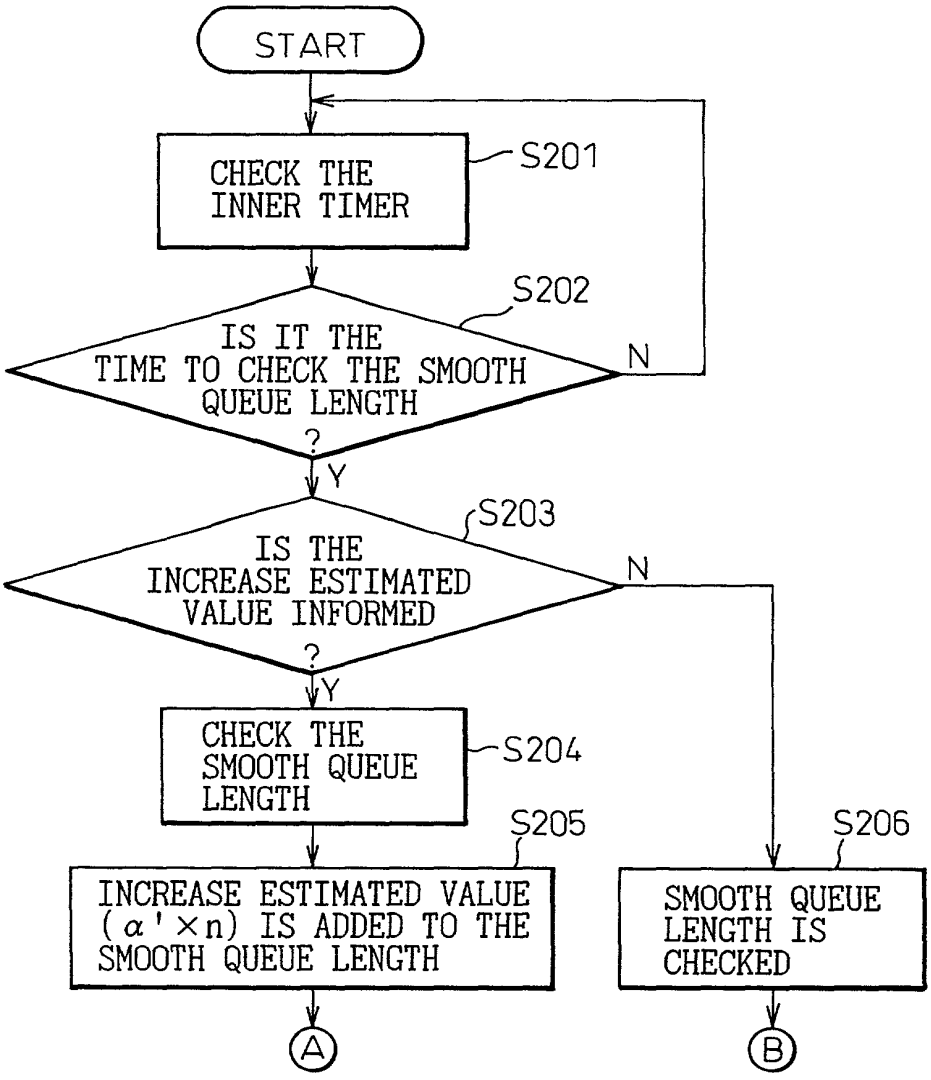

START
S101
HAS THE PACKET ARRIVED ?
N
Y
S102
IS THE DISCARDING FLAG ON ?
N
Y
S103
DISCARD THE ARRIVAL PACKET
S104
OUTPUT THE ARRIVAL PACKET INTO THE OUTPUT QUEUE AND THE INPUT DATA MEASUREMENT SECTION
END

Fig.16



$\alpha' = \alpha - \gamma$

α: QUANTITY OF DATA INPUTTED INTO THE SMOOTH QUEUE LENGTH CALCULATING SECTION AT EACH Δt

γ: QUANTITY OF DATA OUTPUTTED FROM THE SMOOTH QUEUE LENGTH CALCULATING SECTION AT EACH Δt

maxTH: THRESHOLD VALUE OF THE QUEUE THAT HAS BEEN SET

$\Delta t \times n$: EFFECTIVE TIME OF INFORMATION OF INCREASE ESTIMATED VALUE

Fig.17

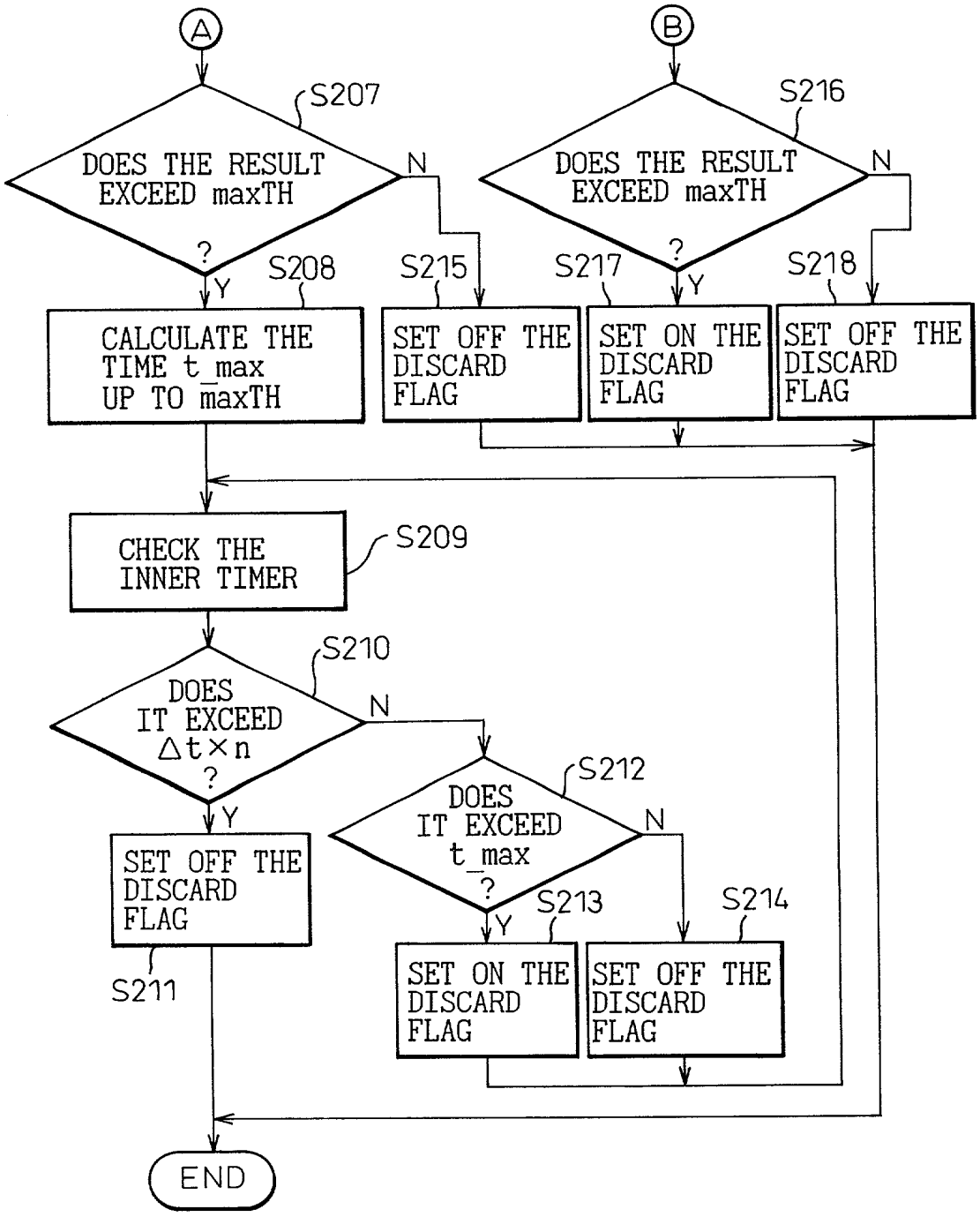
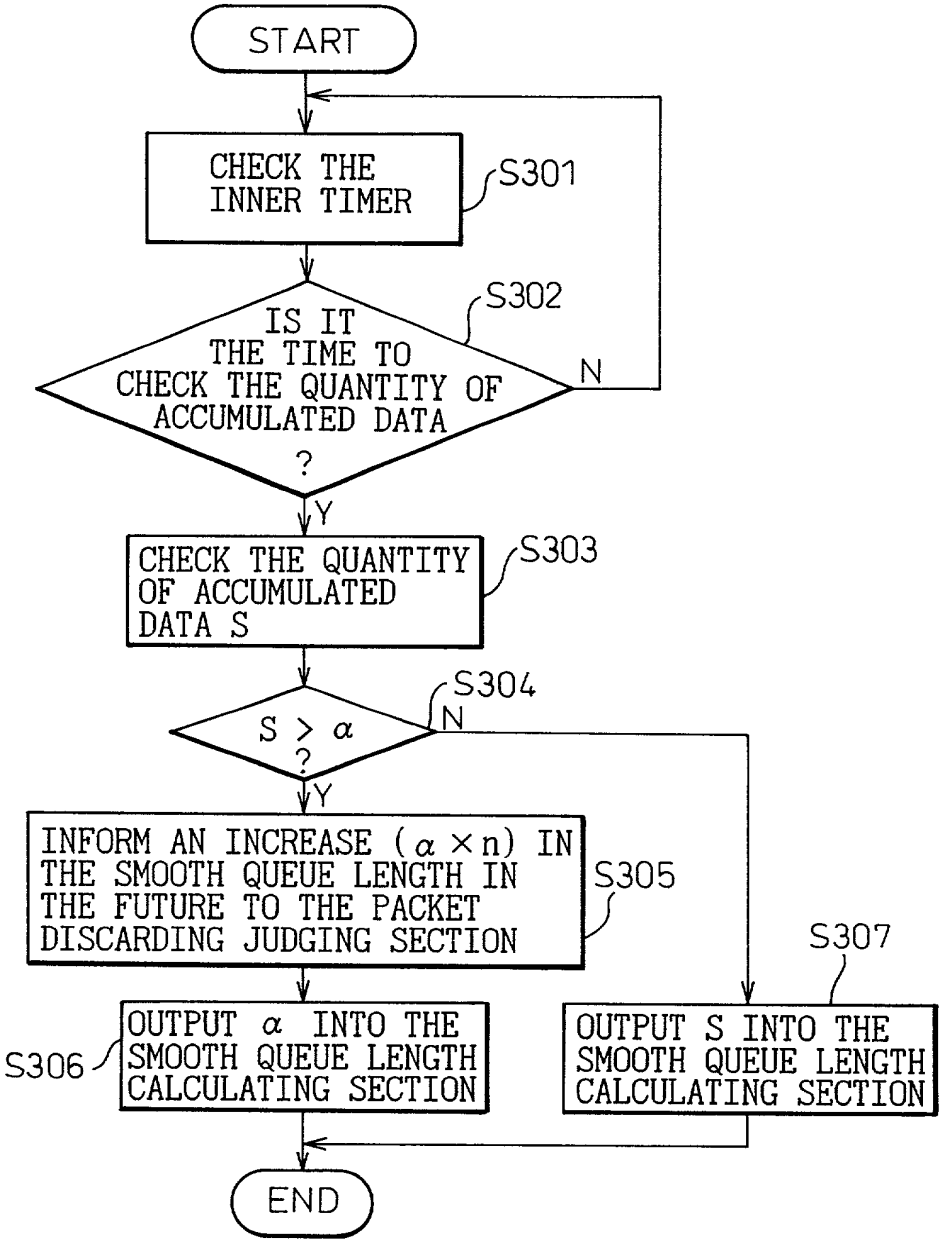

A
B
S207
DOES THE RESULT EXCEED maxTH ?
N
Y
S208
CALCULATE THE TIME t_max UP TO maxTH
S215
SET OFF THE DISCARD FLAG
S216
DOES THE RESULT EXCEED maxTH ?
N
Y
S217
SET ON THE DISCARD FLAG
S218
SET OFF THE DISCARD FLAG
CHECK THE INNER TIMER
S209
S210
DOES IT EXCEED Δt×n ?
N
Y
SET OFF THE DISCARD FLAG
S211
S212
DOES IT EXCEED t_max ?
N
Y
S213
SET ON THE DISCARD FLAG
S214
SET OFF THE DISCARD FLAG
END

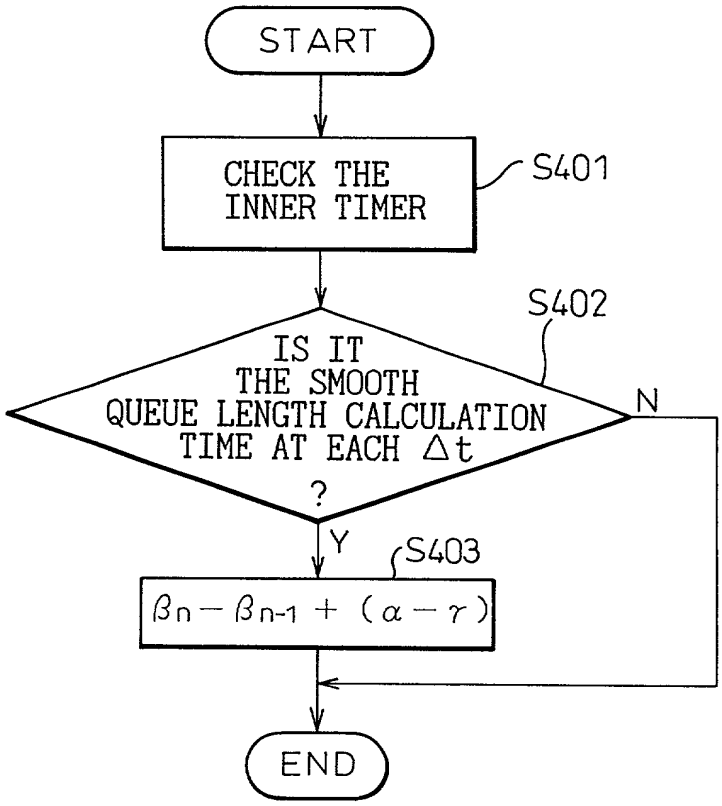
Fig.18



S: QUANTITY OF ACCUMULATED DATA IN THE MEASUREMENT SECTION

α: QUANTITY OF DATA OUTPUTTED FROM THE MEASUREMENT SECTION AT EACH Δt

Fig.19



β_{n-1}: SMOOTH QUEUE LENGTH UP TO THE LAST TIME
β_n: SMOOTH QUEUE LENGTH OF THE PRESENT TIME
α: QUANTITY OF DATA INPUTTED INTO THE SMOOTH QUEUE LENGTH CALCULATING SECTION IN Δt
γ: QUANTITY OF DATA OUTPUTTED FROM THE SMOOTH QUEUE LENGTH CALCULATING SECTION IN Δt